Relationship between protrusive record and horizontal condylar guidance angle

Chandrasekharan Nair K.*
Manikya Arabolu**
Jayakar Shetty***
Vahini Reddy****
Divya Hegde*****

Abstract

Context: Condylar guidance angle is adjusted in the articulator using protrusive record. Protrusive record is made using the gothic arch tracing, keeping the stylus 6 mm away from the arrow point. The reason for selecting 6 mm is that normal functions occur within this range of movement. However, the effect of keeping the stylus at different positions on the protrusive tracing and its effect on the horizontal angle programming is not well documented and hence the present study.

Objective: To find out and compare the horizontal condylar angulations obtained with records made at different protrusive positions.

Materials and methods: Twelve completely edentulous patients were selected. Steps of denture fabrication were carried out conventionally till gothic arch tracing. Protrusive records were made of plaster at 2mm, 4mm, 6mm, 8mm and 10mm beyond the centric relation point on the protrusive tracing. Plaster records were then used to program the articulator and the variation in condylar guidance angles were noted.

Results: Right condyle showed a horizontal condylar guidance of 7.083° ± 5.42° at 2 mm protrusion, 14.17° ± 6.56° at 4 mm, 18.75° ± 5.28° at 6mm, 18.33° ± 3.89° at 8mm, 11.25° ± 4.33° at 10 mm while the left condyle had a horizontal condylar guidance of 10.42° ± 7.22° at 2 mm, 17.08° ± 10.97° at 4mm, 22.5° ± 6.66° at 6mm, 18.75° ± 5.69° at 8 mm, 14.58° ± 5.42° at 10 mm.

Conclusions: While programming, the record obtained at 2 mm did not make the condylar elements to put adequate pressure on the condylar path to set the right and left condylar angles. Till 6 mm, the condylar angles were found to increase after which there was a decrease as the protrusion reached 10 mm.

MeSH words: Horizontal condylar guidance angle, protrusive record, programming.

A semiadjustable articulator is accurate only in two positions—a centric relation and at the protrusive position at which the records are made. The path between these two positions in the articulator may differ significantly from that of the mandibular path. The condylar path in the articulator is rectified and in nature it is not so. Horizontal condylar guidance angle of the articulator is adjusted using protrusive record made by keeping the stylus at the desired point in the protrusive tracing.

To obtain protrusive record, conventionally a point on the protrusive tracing 6 mm away from the arrow point is selected. Normal functions occur within this range of movement. If it is set at a distance of less than 6 mm, the force that the condylar element exerts on the housing is too less for self adjustment, in other words the articulator will not be sensitive enough. If the condylar angle is set at a distance greater than 6 mm, the condyle moves beyond the eminence and the horizontal angle obtained, becomes less steep. The position on the protrusive tracing and its relation with the horizontal condylar angle is not well documented and hence the present study. The objective of the study was to find out and compare the horizontal condylar angulations obtained with records made at different protrusive positions.

Methodology

Twelve completely edentulous patients were selected for whom primary impressions were made...
using condensation silicone putty and light body. Border moulding was done using addition silicone putty and the final impression was made using addition silicone light body. Permanent record bases were fabricated using heat cure clear acrylic resin. A face bow transfer was carried out for each patient followed by registration of centric relation using the check bite method. The casts were mounted on a semi adjustable articulator - Hanau Wide- Vue Arcon Articulator 183-2, Whip Mix Corporation (Fig 1). Central bearing plates and extraoral tracers were attached to the maxillary and mandibular occlusal rims while maintaining parallelism between both the plates (Fig 2). A contrast medium was applied on the tracing plate. The patient was asked to bite and make protrusive and lateral excursive movements (Fig 3). After obtaining the tracings, a plastic plate was fixed on the tracing table. Holes were drilled on the plastic plate corresponding to 2mm, 4mm, 6mm, 8mm and 10 mm to hold the stylus in the respective positions on the protrusive tracing (Fig 4). Six interocclusal records were obtained using fast setting plaster, the centric relation record was used to verify the centric relation recorded during check bite jaw relation procedure while the records obtained at 2mm, 4mm, 6mm, 8mm and 10mm were used to program the articulator (Fig 5-7).

Results

The values of right and left condylar guidance angles were measured on the articulator and recorded. The mean value of all these measurements at the above points on protrusive tracing are tabulated (Table I). It was seen that both the right and left condyle showed a low horizontal condylar guidance angle at 2mm which increased till 6mm. Beyond this point at 8mm and 10mm a reduction in horizontal condylar guidance was seen.

<table>
<thead>
<tr>
<th>Distance from centric on protrusive tracing</th>
<th>Right condyle (Mean ±SD)</th>
<th>Left condyle (Mean ±SD)</th>
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</thead>
<tbody>
<tr>
<td>2mm</td>
<td>7.08 ± 5.42</td>
<td>10.42 ± 7.22</td>
</tr>
<tr>
<td>4mm</td>
<td>14.17 ± 6.56</td>
<td>17.08 ± 10.97</td>
</tr>
<tr>
<td>6mm</td>
<td>18.75 ± 5.28</td>
<td>22.5 ± 8.66</td>
</tr>
<tr>
<td>8mm</td>
<td>18.33 ± 3.89</td>
<td>18.75 ± 5.69</td>
</tr>
<tr>
<td>10mm</td>
<td>11.25 ± 4.33</td>
<td>14.58 ± 5.42</td>
</tr>
</tbody>
</table>

Discussion

While programming, the record obtained at 2 mm did not make the condylar elements to put adequate pressure on the condylar path to set the condylar angles. The record obtained at 2mm was not efficient to programme the horizontal condylar angle. Till 6 mm the condylar angles were found to increase after which there was a decrease especially when the protrusion was 10 mm. Records obtained at 6mm and 8mm seems to be reasonable because the angulation falls within the normal range.

Conclusion

The practice of obtaining protrusive record at 6 mm can be considered as a logical option.

Table I – Mean values of horizontal condylar guidances obtained (In degrees)